

CLAIMS

1. A method of producing a I-III-VI<sub>y</sub> compound in thin film form by electrochemistry, in which y is close to 2 and VI is an element comprising selenium, of the type comprising the following steps:
- 5 a) of providing an electrolysis bath comprising active selenium, in oxidation state IV, and at least two electrodes; and
- 10 b) of applying a potential difference between the two electrodes in order to substantially promote migration of the active selenium toward one of the electrodes and thus initiate the formation of at least one thin film of I-III-VI<sub>y</sub>,
- 15 characterized in that it furthermore includes a step c) of regenerating the selenium in active form in said bath, in order to increase the lifetime of said electrolysis bath.
- 20 2. The method as claimed in claim 1, characterized in that, at step c), an oxidizing agent for selenium (Se(0)) is introduced into the bath in order to regenerate selenium in active form (Se(IV)).
- 25 3. The method as claimed in claim 2, characterized in that, when the bath contains selenium in colloid form (Se(0)) at step b), said oxidizing agent is designed to regenerate the selenium in colloid form (Se(0)) to selenium in active form (Se(IV)).
- 30 4. The method as claimed in either of claims 2 and 3, characterized in that said oxidizing agent is hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>).
- 35 5. The method as claimed in claim 4, characterized in that the concentration of hydrogen peroxide added to the bath is of the order of magnitude corresponding substantially to at least five times the initial

selenium concentration in the bath.

6. The method as claimed in one of claims 1 to 5, characterized in that, at step c), selenium is added to  
5 the bath in order to form an excess of active selenium in the bath.

7. The method as claimed in claim 6, characterized in that, for substantially one tenth of the concentration  
10 of selenium at step a) consumed by producing at least one thin film at step b), substantially twice the consumed concentration is added to the bath at step c).

8. The method as claimed in one of the preceding  
15 claims, characterized in that, after step c), at least one new thin film of I-III-VI<sub>y</sub> is formed.

9. The method as claimed in one of the preceding claims, characterized in that, to produce thin CuInSe<sub>y</sub>  
20 films, the bath comprises, at step a), for one unit of concentration of copper in the bath, about 1.7 units of concentration of active selenium.

10. The method as claimed in one of the preceding  
25 claims, characterized in that it includes a step after step c), of regenerating the electrolysis bath by introducing oxides and/or hydroxides of elements I (CuO; Cu(OH)<sub>2</sub>) and III (In<sub>2</sub>O<sub>3</sub>; In(OH)<sub>3</sub>).